

Macros Used for Calculating MACT Floors

Macro and Data File Set-up

The MACT floor analyses can be performed using Excel Visual Basic Macros. The Macros are all contained, as separate modules, in the Excel file titled “mact macros”. There are four Macros, each used for a different MACT analysis procedure:

- **Emiss** – Contained in Module 1. Used to run the Emissions Approach. Can be used for either the hazardous waste thermal emissions (Appendix D) or stack gas emissions concentration (Appendix C) format.
- **SREFeed** – Contained in Module 4. Used to run the SRE-Feed Approach (Appendix E). Additionally, the SRE-Only MACT Approach (Appendix H) can be run using the SRE-Feed Macro by setting the Feed ranks to zero.
- **ETC** – Contained in Module 5. Used to run the ETC Approach (Appendix I).
- **SREHighFeedScreen** – Contained in Module 6. Used to run the SRE-High Feed Screen Approach (Appendix J).

The data files pertaining to these different MACT analysis procedures are in the following appendices of the Technical Support Document Volume III:

- Appendix C – Emissions
- Appendix D – Hazardous Waste Thermal Emissions
- Appendix E – SRE-Feed
- Appendix H – SRE-Only
- Appendix I – ETC
- Appendix J – SRE-High Feed Screen

The macros can be used with all of the data files except the:

- PM files
- For the SRE-Feed (Appendix E): Cl for cement kilns and HCl production furnaces, and Hg for LWAKs.
- For the SRE-Only (Appendix H): Hg for LWAKs.

For these cases the calculations are explicitly contained in the “calcs” worksheet.

Steps to Run Macros

The following steps are used to run the Macros:

- (1) Open the file containing the test condition data for the specific HAP / source category for which the analysis is desired.

Example: “E_CK_SVM” is the file for the Emissions Approach for SVM for cement kilns

- (a) An existing worksheet in the file, named “calcs”, will contain the MACT calculations. Rename this worksheet to anything else, for example to “old_calcs” (right click on worksheet icon at bottom of page to rename). Create a new empty worksheet with the name “calcs” (select the insert/worksheet pull down menu). The MACT floor calculation results created by the Macro are stored in (written into) this “calcs” worksheet. Additionally, if running the ETC approach, a second blank worksheet named “calcs 1” should be created.
- (b) The test condition file will also contain a worksheet with the condition data – make sure it is named “data”. Alternatively set up a worksheet that contains the required test condition data, and name it “data”. The set-up of the “data” worksheet has the following requirements:
 - .. The group of test conditions to be considered in the MACT analysis must start in row number 6.
 - .. There must be no empty, blank rows separating the group of test conditions that are to be considered in the MACT analysis.
 - .. There must be an empty, blank row separating the last test condition in the group to be used for the MACT analysis from any other test conditions that are not to be used in the MACT analyses.

As long as the above requirements are met, the user may select different test conditions for the MACT analysis. For example, if additional conditions are added to the ones being considered for MACT analysis, all the “MACT” conditions must: (a) start at row 6; (b) be contained in successive rows in the worksheet; and (c) be separated from the “non MACT” conditions by an empty row.

- (2) Open the “mact macros” file.
 - (a) Select the worksheet in the “mact macros” file that corresponds to the type of MACT analysis procedure that is desired.

Example: Select the “input_emissions” worksheet for the Emissions

Approach.

- (b) Identify a column that has already been prepared that corresponds to the data file name opened in step (1).

Example: In the “input_emissions” worksheet, column # 19 corresponds to SVM for cement kilns.

The information in this column directs the macro to the appropriate columns in the data file. Check that the information in this column is correct – Is the name of the data file correct? Do the numbers for Condition ID, Source ID, Rating flag etc. relate to the correct column numbers in the data file¹?

Example: In column 19 of the “input_emissions” worksheet contained in the Mact Macro, filename = E_CK_SVM, condition ID = 4 and starting column # for emissions = 33. This means that in the E_CK_SVM data file, the source ID numbers should be in column 4 (or column D), and run 1 of the emissions should be in column 33 (or column AG).

- (c) If needed, create a new column in the mact macro file with the required information, including the column numbers that correspond to the location of data in the “data” worksheet of the file setup in step 1(b)
- (3) Update the mact macro file for the desired HAP/source category option input data:
 - (a) Select the mact macro worksheet named “commands”.
 - (b) Enter the appropriate column number from the first row of the “input” worksheet (identified in step 2 (b) or (c)) in cell A1 of the “commands” worksheet.

Example: For the emissions approach, SVM for cement kilns would have column # 19.

When the macro runs in step 4, the number in cell A1 of the “commands” worksheet directs it to the appropriate column of the “input” worksheet.

- (4) Run the desired Macro.

¹ To change column headings from A, B, C... etc to 1, 2, 3 in an excel file select tools/options/general from the pull down menu and select “R1C1 reference style”.

- (a) Select the tools/macro/macros pull down menu (or type alt+F8).
- (b) Select the macro name that is desired, and hit the run button. The results will be written into the “calcs” sheet.
- (c) Copy the format from the previously formatted “calcs” sheet to the new “calcs” sheet for which the macro has just made the calculations. (To do this, select the entire sheet of the formatted worksheet and select edit/copy; then select the entire unformatted “calcs” sheet and select paste special/format. Additionally, column headings and other text also need to be copied from the formatted calculations sheet to the new “calcs” sheet.)

Note: In order to use the SRE-Feed macro to run the SRE-Only Approach go to tools/macro/visual basic editor and select Module 4. Look for a comment line (near line 614 of the file) that says, “Use for SRE only ranking analysis”. Remove the (‘) from in front of the five lines of code that immediately follow the comment. Ensure that one of these lines of code says “RankF(i) = 0”. Close the visual basic editor and run the macro as described in step (4).

Running the SAP Macro

The SAP MACT floor approach can be performed using a macro contained in the excel file “SAP.xls”. To run the SAP macro:

- (1) Determine the desired combustor category (liquid boiler, cement kiln, etc) and emissions type (stack gas emissions or hazardous waste thermal emissions).
- (2) For the specific emissions type and combustor category, open the data files (from Appendix C or D) for PM, SVM, and LVM. If the any of the data file names have a N or CT before the “.xls” extension remove the “N”or “CT” by renaming the file. Make sure that there is a worksheet named “calcs” in each of these files with the MACT calculations from the “Emiss”macro. The SAP macro uses the results of the Emiss macro as inputs.
- (3) Open the macro file SAP.xls. Create a blank worksheet. Click the cursor anywhere in the blank worksheet.
- (4) Select tools/macro/visual basic editor and go into the macro titled “SAP” (Module 1).
- (5) Modify the lines of code to enter the desired combustor category and emissions type using the

instructions contained at the beginning of the macro.

- .. Select HAP1 = Y or N depending on whether or not the SAP method should be run in the case where test condition data is used when only two or more HAPs are available (N), or when one or more are available (Y).
- (6) Save changes and run macro. The results will be written into the blank worksheet in the SAP.xls file which is currently selected.
- (7) These results can be compared to the ones that have already been generated by looking at the pertinent worksheet in SAP.xls

Nomenclature of terms used in macro visual basic code

Add	1 for no non-detects, 2 for non-detects
avgavg	average of test condition averages of best performing MACT pool sources
c	column number of mact macro "input" worksheet which is used
CAE(i)	test condition average for emissions (average of individual runs for test condition)
CAF(i)	test condition average for feeds (average of individual runs for test condition)
calc	"calcs" worksheet (worksheet where results of macro calculations are written)
CAS(i)	test condition average for SRE (average of individual runs for test condition)
campno	column number in the data worksheet containing the campaign number
cid(i)	condition ID number for test condition
CN(i)	campaign number for test condition
condavgcolE	column number in "data" worksheet containing emissions condition average
condavgcolF	column number in "data" worksheet containing feed condition average
condavgcolS	column number in "data" worksheet containing SRE condition average
CondID	column number in "data" worksheet containing condition ID number
data	"data " worksheet (worksheet which contains the test condition information used for the MACT analysis)
dof	degrees of freedom
E99(i)	upper 99 %ile emissions for test condition
Eavg(i)	test condition average for emissions (average of individual runs for test condition)
Emax	highest of the test condition upper 99 %ile emissions
emisscolstart	column number for the first emissions run in the "data" worksheet
Estdev(i)	standard deviation of emissions individual runs of test condition
F99(i)	upper 99 percentile feed for test condition
Favg(i)	test condition average for feeds (average of individual runs for test condition)
feedcolstart	column number for the first feed run in the "data" worksheet
Filename	name of data file

Fmax	highest of the test condition upper 99 %ile feeds
Fstddev(i)	standard deviation of feed individual runs of test condition
indata	data worksheet used by mact macro file to read in test condition data
mactlmt	MACT floor limit
mactno	number of “best performing” MACT pool sources.
nc	number of test conditions used for MACT analysis
nca	number of test conditions adjusted for multiple conditions arising for a single source (only applicable to “normal” data)
NE, NS, NF	number of runs for emissions, feeds, and SREs
NoR	number of runs in test condition
NRE(i)	number of emissions runs in test condition
NRF(i)	number of feed runs in test condition
NRS(i)	number of individual SRE runs in a test condition
percent	confidence level
RankE(i)	rank of the individual test condition emissions 99 % ile
RankF(i)	rank of the individual test condition feed 99% ile
RankS(i)	rank of the individual test condition SRE 99% ile
Ranksum(i)	sum of the individual test condition SRE and feed ranks
Ratflag	column number containing the test condition rating flag in the data worksheet
RF(i)	rating flag for each test condition
sc	total numbers of “extra” conditions when a single source had more than one condition in the MACT analysis (applicable to “normal” data)
SID(i)	source ID number for test condition
Skip	indicates presence of non-detect columns for emissions, feeds, and SREs
sourceid	column number containing the source ID number in the data worksheet
SRE99(i)	upper 99 %ile SRE for test condition runs
SREavg(i)	condition average of SREs for individual test condition runs
SREcolstart	starting column for SRE data (first run) in the data worksheet
SREmin	lowest of test condition SRE 99 %iles
SREstddev(i)	standard deviation of SREs for test condition runs
startrow	starting row for test condition data in the data worksheet
stdevpool	pooled standard deviation of MACT pool sources